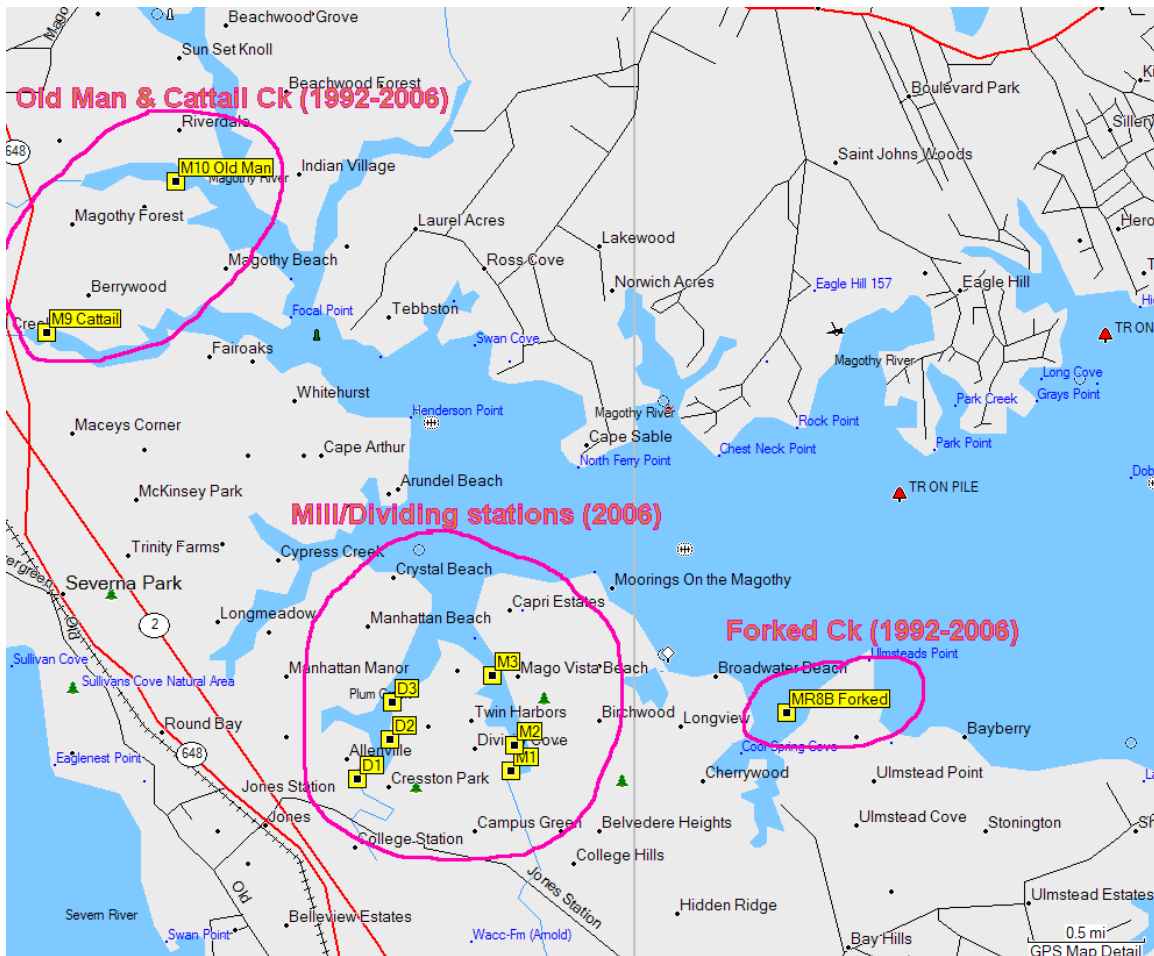


Percentage of observations below certain values in Mill & Dividing creeks in 2006, compared to values over the same period from three other Magothy creeks, and to past data from those creeks.

(Data through 7-1-06 only, draft 7-14-06 by Peter Bergstrom, NOAA & MRA)

Local volunteers are collecting water quality data at six tidal stations in Mill & Dividing creeks in 2006. Their locations are shown in the map below (D1-D3 and M1-M3). Magothy River Association volunteers led by Peter Bergstrom have measured similar water quality parameters in three other tidal Magothy stations since 1992, in two upper creeks (Old Man M10 and Cattail M9), and in the mouth of one creek in mid-river (Forked MR8B). This summary was prepared to compare the water quality in 2006 at Mill & Dividing stations to water quality at the other three stations, and to compare this to water quality at the other three stations from 1992-2005.

Figure 1. Map of the 6 tidal monitoring stations in Mill & Dividing creeks sampled in 2006, and three other tidal Magothy monitoring stations sampled from 1992-2006.



Station depths are not strictly comparable between the two groups (see Table 1 below). The other sites are deeper, about 2-4 m deep, while two of the Mill & Dividing sites are shallower, less than 0.5 m deep (M1 and D1) and the rest are about 1.5-2 m deep. This difference in depths is most likely to affect the dissolved oxygen (DO) readings, since they are sampled at surface and bottom. Bottom DO tends to be lower at deeper stations because the bottom is farther from the air. Thus, we would expect lower (worse) DO readings at the other stations because they tend to be deeper.

Table 1. Tidal Magothy water monitoring stations and their depths.

Station	Creek	Depth (m)	Years sampled
M9	Cattail	1.7	1992-2006
M10	Old Man	1.7	1992-2006
MR8B	Forked	4.0	1992-2006
D1	Upper Dividing	0.45	2006
D2	Mid Dividing	1.45	2006
D3	Lower Dividing	2	2006
M1	Upper Mill	0.3	2006
M2	Mid Mill	0.8	2006
M3	Lower Mill	1.85	2006

Comparisons were made by comparing the percent of observations that fell below certain values. These values were chosen based on the habitat requirements of some of the plants and animals that live in the Magothy.

- For Secchi depth (water clarity) the level was 0.5 meters because if clarity is often below that value, underwater grasses usually can't grow. Ideally, the median Secchi depth would be at least 1.0 m, but that rarely happens in the Magothy.
- Two levels were used for DO. Most fish need DO > 5 mg/l to be healthy, while crabs and oysters can tolerate lower DO, down to about 2 mg/l. Thus, DO < 2 mg/l is low enough to harm most of the animals living in the Magothy. Levels this low were sometimes seen in surface as well as bottom samples.
- The level used for salinity was < 6 ppt or parts per thousand. While all of the plants and animals that live in the Magothy can tolerate a range of salinities, we see species shifts in the underwater grasses in dry years compared to wet years, and 6 ppt is generally the transition point from lower to higher salinity species.

NOTES for Table 2 (below)

1. Sampling dates were the same except the other stations were sampled only once a month instead of twice, except I sampled them twice in June.
2. Secchi depth. Low values were more frequent in Mill & Dividing creeks. However, as noted above, none of the other monitoring sites are in water as shallow as sites M1 and D1, where most of the low Secchi values in Mill & Dividing creeks occurred (some were also at M2 and D2). Shallow sites may have more resuspension of bottom sediments, which lower Secchi depth.
3. DO. Surface and bottom values < 5 had the same frequency in the two groups of creeks. Values < 2 were more frequent in the other creeks, which (as noted above) are deeper than some of the Mill & Dividing sites. Deeper sites tend to

have lower bottom DO because bottom waters are farther from the oxygen in the air. Values < 2 were more frequent in the other creeks this year compared to the average over past years.

4. Salinity < 6 (surface and bottom) had about the same frequency in the two groups of creeks this year. Values < 6 were much more common in past years at the other sites, since this year has been dry and many of them were wet years.

Table 2. Comparison of parameter ranges for Mill & Dividing stations to the three other tidal Magothy stations.

Parameter & range	Magothy Creeks	% this occurred over April-July 2006	% over past years (1992-2005) for Cattail, Old Man, & Forked creeks
Secchi < 0.5	Cattail, Old Man, Forked	0%	5%
Secchi < 0.5	Mill & Dividing	33%	-
DO < 5	Cattail, Old Man, Forked	40%	27%
DO < 5	Mill & Dividing	43%	-
DO < 2	Cattail, Old Man, Forked	23%	10%
DO < 2	Mill & Dividing	14%	-
Salinity < 6	Cattail, Old Man, Forked	7%	41%
Salinity < 6	Mill & Dividing	9%	-